

CLAIMS

What is claimed is:

1. An apparatus which demodulates a code word having a second predetermined bit length greater than a first predetermined bit length, the code word resulting from modulation of a data word having the first predetermined bit length, the apparatus comprising:
a code table comprising a plurality of the code words, wherein similar ones of the code words are arranged to be grouped together; and
a soft demodulator to calculate probabilities of individual bits that constitute the code words, and to generate a soft demodulation value of the data word.
2. The apparatus of claim 1, wherein the code table is formed by converting one column, containing all the code words, into a predetermined number of columns.
3. The apparatus of claim 2, wherein the code words are allocated to the predetermined number of columns such that common portions of the code words are arranged in common ones of the predetermined number of columns.
4. The apparatus of claim 3, wherein common neighboring portions are written one time in a single section of the respective common ones of the predetermined number of columns.
5. The apparatus of claim 1, wherein the soft demodulator reuses a result of a calculation on a code word portion in the code table, without performing the calculation again, when a current code word has an identical portion to the code word portion already calculated.
6. The apparatus of claim 1, wherein the code words correspond to an input signal received by the soft demodulator.
7. The apparatus of claim 6, wherein the input signal is a run-length limited code signal transmitted through a transmission channel or output from a soft channel detector.

8. A method of demodulating a code word having a second predetermined bit length greater than a first predetermined bit length, the code word resulting from modulation of a data word having the first predetermined bit length, the method comprising:

using a code table comprising a plurality of code words, wherein similar ones of the code words are arranged to be grouped together; and

calculating probabilities of individual bits that constitute the code words, and generating a soft demodulation value of the data word.

9. The method of claim 8, wherein the code table is formed by converting one column, containing all the code words, into a predetermined number of columns.

10. The method of claim 9, wherein the code words are allocated to the predetermined number of columns such that common portions of the code words are arranged in common ones of the predetermined number of columns.

11. The method of claim 10, wherein common neighboring portions are written one time in a single section of the respective common ones of the predetermined number of columns.

12. The method of claim 8, wherein the generating a soft demodulation value comprises reusing a result of a calculation on a code word portion in the code table, without performing the calculation again, when a current code word has an identical portion to the code word portion already calculated.

13. The method of claim 8, further comprising receiving an input signal that corresponds to the code words.

14. The method of claim 13, wherein the input signal is a run-length limited code signal transmitted through a transmission channel or output by a soft channel method.

15. A code table to be used by a soft demodulator; the code table comprising:
a plurality of code words arranged so that similar ones of the code words are grouped together;

wherein the code table is divided into a predetermined number of columns containing portions of the code words, and common neighboring portions of the code words are written one time in a single section of the respective columns.

16. An apparatus to demodulate a code word resulting from modulation of a data word, the apparatus comprising:

- a soft demodulator to demodulate the code word; and
- a code table used by the soft demodulator, in which common portions of a plurality of the code words are entered only once, so that a number of calculations and a calculation time are reduced when a log likelihood ratio (LLR) is calculated.

17. An apparatus to demodulate a code word resulting from modulation of a data word, the apparatus comprising:

- an efficiently configured decoding table to perform soft demodulation on RLL codes;
- wherein calculations on common portions of a plurality of the code words are not repeated.